A NEW SPECIES OF SIGMOIDEOMYCES THAXTER.

With Plate XII.

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In November 1921 a fungus was discovered growing on the surface of soil in a pot in the greenhouse attached to the Botanical Department, at University College, Cardiff, which proved to be a new species of *Sigmoideomyces* Thaxt., a genus of Mucedinaceae.

This genus has a curious history. The type species is *S. dispiroides* Thaxt., described from Burbank, E. Tennessee; habitat rotten wood. A second species was found by Mrs Bayliss Elliott at Birmingham and described by her under the name of *S. clathroides*. The present form makes a third species. The genus has therefore only been seen thrice, at widely separated stations and on each occasion in a different specific form.

The species under consideration was found on the soil in a pot in which seeds of *Impatiens sultani* had been sown about ten days previously. The soil was of the same blackish or sooty tinge, common in city gardens, as that on which the Birmingham specimens were found, giving a slightly acid reaction at about *p*H 6·0. It had not been long in the pot, but had been in use for potting purposes in the greenhouse for some time. The average temperature of the greenhouse during November is 65°–70° F. and it is neither very light nor very well ventilated.

As Mrs Bayliss Elliott connects the occurrence of her species with the presence of dead earthworms in the soil, I should say here that there did not appear to be any dead worms in the original pot of soil, though they may have disappeared by decay before I turned it out some time later; neither have attempts to recover it by enclosing samples of the soil, containing dead worms, in stoppered glass jars, been successful, though they have stood the full six months Mrs Bayliss Elliott found necessary for its development. This does not however disprove the interesting correlation which certainly appeared in her cultures. Attempts to obtain artificial cultures were unavailing, though several times repeated, owing to the abundance of bacteria both on and around the conidial fructifications. The wild growth disappeared after about six weeks and has not been seen since.

The naked-eye appearance of the fungus is that of a number of buff-coloured, fluffy balls, about 1 mm. in diameter and 2–3 mm. apart, dispersed in patches on the surface of the soil, the connecting, sterile mycelium being so fine as to be scarcely visible. These balls are the conidial fructifications, each com-

posed of a radiating mass of tapering, branched and apparently dichotomising hyphae, from which arise laterally the globose conidiophores on slender pedicels. The conidiophores are borne only on the stouter branches, towards the centre of the mass, so that they are protected by the sterile, apical portions of the hyphae. They arise in pairs, one on each side of the large cells which form the angles of the dichotomies.

The branching of the upper portions of the hyphae is strictly monopodial and in spite of appearances I am persuaded that it is so throughout and that the apparent dichotomy of the basal portions is due to secondary divergence of branches which are not in reality of equivalent rank. Reference to Pl. XII, fig. 5 will make this point clearer. Each conidiophore bears 25–30 short, conical sterigmata on each of which is one spherical, minutely echinulate conidium. The development of the conidium follows that of the conidiophore in point of time, being budded off when the latter has practically reached its full size. Both conidia and conidiophores are very caducous and the latter also readily collapsible, except perhaps when fully mature. The angle-cells, likewise, on which they are borne seem easily distorted by the leverage of the branches.

One curious feature, in which this species is peculiar, is the development of little prominences on the cells towards the apex of the filaments, easily seen with a low power and suggesting sterigmata, though no propagative bodies have ever been seen attached to them. High magnification on the other hand, reveals that each hypha bears a dense epiphytic flora of filamentous bacteria (*Leptothrix*?) which look exactly like flagellar appendages, particularly as one or more is regularly attached to each of the aforementioned prominences.

The vegetative mycelium, from which these perithecial-like balls of hyphae arise, is scanty and consists of long, unseptate filaments with an average diameter of 2–3 μ and very sparingly branched.

The claim of this new form to specific distinction rests on the following points:—(*a*) The rectilinear fertile hyphae, lacking that sigmoid curvature whence the genus takes its name. This is an important departure from the type, although in a character probably subject to environmental modification, but the *ensemble* of habit and structure undoubtedly points to its inclusion in the genus even though it should thus render the generic name no longer apt. That is not a matter on which too much stress need be laid for the validity of this or indeed of most genera does not rest on a single feature but properly on the syndrome of characters in the generic definition. (*b*) The rigidly divaricate and pseudo-dichotomous branching of the fertile hyphae. (*c*) The prominences on the apical portions of these hyphae.

(*d*) The smaller conidia with exosporic emergences, less prominent, however, than in the type species.

The present form, which I call *Sigmoideomyces divaricatus*, is notably more closely allied to Thaxter's American species than to the Birmingham one.

Mrs Bayliss Elliott raised the interesting question whether *Sigmoideomyces* was congeneric with *Gymnoascus*. The resemblance of these masses of fertile hyphae to the perithecia of that genus is certainly striking but the conidial and ascigerous forms have not been found in conjunction and the matter is still open. It must be admitted, however, that the Birmingham species, *S. clathroides*, is more like *Gymnoascus* than are either *S. dispiroides* or *S. divaricatus*.

SIGMOIDEOMYCES Thaxter, emend.

Fertile hyphae septate, loosely aggregated and either bent into many sigmoid curves or radiating from a common centre; branching sub-dichotomous, the ultimate branches sterile. Conidiophores vesicular, spherical, borne laterally on the hyphae by a stalk. Sterigmata short, spine-like, scattered. Conidia one-celled, spherical, echinulate or almost hyaline.

S. divaricatus n.sp. Fertile hyphae forming buff-coloured tufts about 1 mm. in diameter and 2–3 mm. apart; the hyphae rigid, radiating from a common centre, tapering, the ultimate branches freely divaricating and bearing laterally small, conical protruberances. The cells at the angles of dichotomy, in the inner part of the tuft, bear each two short, cylindrical outgrowths, in a plane at right angles to that of the branching, each terminating in a thin-walled, spherical conidiophore, 20 μ (15–25 μ) in diameter, upon which are borne the conidia 6–9 μ, minutely echinulate, hyaline. Sterile hyphae forming a scanty mycelium, each being about 2–3 μ in diameter.

On surface of soil in pot. Greenhouse: Botanical department: University College, Cardiff.

REFERENCES.

THAXTER, R.—On certain new and peculiar North American Hyphomycetes.... Bot Gazette, XVI, p. 14 (1891).

BAYLISS ELLIOTT.—Sigmoideomyces clathroides. A new species of fungus. Trans. Brit. Mycol. Soc. IV, p. 121 (1912).

EXPLANATION OF PLATE XII.

Fig. 1. *Sigmoideomyces divaricatus*. A small "perithecial" tuft of fertile hyphae, teased out, showing the conidiophores, from which the conidia are detached. ×200.

Fig. 2. Portion of an older tuft; the conidiophores having fallen off. ×200.

Fig. 3. A single sterigmaton. ×2000 ca.

Fig. 4. Conidia, and a portion of the conidial wall in section, showing the minute prominences. Conidia ×750.

Fig. 5. Fertile hyphae, illustrating the mode of branching and the attachment of the conidiophores. ×750.